CLAIMS

What is claimed is:

1. A method for operating a communication system, comprising steps of:

defining the system as a combined Code Division Multiple Access CDMA and Frequency Division Multiple Access FDMA system; and

using a variable bandwidth waveform with multiple bonded transmitters and receivers that are each agile in both frequency and code to provide a variable bandwidth and variable rate multiple access system.

2. A method as in claim 1, wherein the use of both CDMA and FDMA together provides an improved concentration efficiency by making a larger pool of bandwidth available to each user.

3. A method as in claim 1, wherein channel bonding across both code space and frequency space enables the system to operate in at least one of a variable, contiguous or non-contiguous bandwidth at a finely variable rate.

4. A synchronous Code Division Multiple Access CDMA and Frequency Division Multiple Access FDMA communications system, comprising:

a base site comprising a transmitter for transmitting a waveform and further comprising a plurality of frequency agile and PN code agile data modulators having an output coupled to a radio channel; and

a subscriber unit comprising a receiver for receiving the transmitted waveform from the radio channel and further comprising a plurality of frequency agile and PN code agile data demodulators.

5. A CDMA and FDMA communications system as in claim 4, wherein there are N modulators and N demodulators each operable for communicating at data rates that are power of two multiples of a basic rate on a plurality of frequency subchannels within a channel.

6. A CDMA and FDMA communications system as in claim 5, wherein said N modulators and N demodulators operate with power of two multiples of the basic rate from a minimum rate to a maximum rate at a granularity that is an integer multiple of the basic rate.

7. A CDMA and FDMA communications system as in claim 4, wherein statistical concentration is achieved when the system has Y Mbps of aggregate capacity allocatable to X users simultaneously at rates of Y/X Mbps each, and by tuning said modulators and demodulators to any one of Z frequency subchannels, the useable bandwidth is Z times the Y Mbps bandwidth of any one channel, and Z*X users are supported simultaneously at rates of Y/X Mbps.

8. A CDMA and FDMA communications system as in claim 4, wherein a bandwidth of any one subchannel is X MHz, and at least some of said plurality of modulators and demodulators are tuned to different ones of contiguous or non-contiguous X MHz sub-channels within a Y MHz channel, where Y> X.

9. A CDMA and FDMA communications system as in claim 8, wherein X=3.5 and where Y=14.

10. A CDMA and FDMA communications system as in claim 4, wherein input data to said plurality of modulators is a punctured convolutional code.

11. A CDMA and FDMA communications system as in claim 4, wherein input data to said plurality of modulators is a rate ½, constraint length 7 code that is punctured to increase the rate.

12. A CDMA and FDMA communications system as in claim 11, wherein the puncturing rate is made adaptive to mitigate fading conditions.

13. A CDMA and FDMA communications system as in claim 11, wherein said output of said modulators is coupled to said radio channel through an end-to-end raised-cosine Nyquist pulse shape filter.